ADVANCE PROGRAM

RE '97

Third IEEE International Symposium on

Requirements Engineering

January 6-10, 1997
Annapolis Marriott
Waterfront Hotel
Annapolis, MD
U. S. A.

Featuring Keynote Talks by

Anthony Hall
Praxis, Inc. (UK)

David Harel
Weizmann Institute of Science (Israel)

Colin Potts
Georgia Institute of Technology (USA)

John Rushby
SRI International (USA)

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(Software Requirements Engineering)

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http://www.itd.nrl.navy.mil/conf/ISRE97

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Alistair Sutcliffe (UK)
Axel van Lamsweerde (Belgium)
Eric Yu (Canada)
Roel Wieringa (Netherlands)
Pamela Zave (USA)

Tutorial Program

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         Monday -- January 6
            9:00- 5:30    Tutorial T1
         Tuesday -- January 7
            9:00-12:30    Tutorial T2A
            2:00- 5:30    Tutorial T3A
            9:00-12:30    Tutorial T2B
            2:00- 5:30    Tutorial T3B
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Full-Day Tutorial T1
Making Requirements Measurable
Bashar Nuseibeh (Imperial College)
Suzanne Robertson (Atlantic Systems)

Participants in this "interactive" tutorial examine measurability by building a requirements specification for a familiar system. A requirements template is used as a guide. How measurable requirements can be used to build a requirements quality filter is described.

Half-Day Tutorial T2A
Requirements Specification and Analysis With SCR
Stuart Faulk (University of Oregon)
Connie Heitmeyer (Naval Research Laboratory)

This tutorial describes the practical, industrial-strength Software Cost Reduction (SCR) method for developing requirements. The formal model that underlies SCR and software tools supporting consistency checking, simulation, and verification are described. The application of SCR to two practical systems is discussed.

Half-Day Tutorial T3A
Software Requirements Specification and System Safety
Mats Heimdahl (University of Minnesota)
Jon Reese (University of Washington)

After introducing system safety, this tutorial discusses how software control affects safety analysis and outlines the root causes of safety problems. The formal language RSML (Requirements State Machine Language) is introduced. RSML has been used to capture the requirements of several safety-critical systems, most notably TCAS II.

Half-Day Tutorial T2B
Requirements Traceability
Anthony Finkelstein (City University, London)
Richard Stevens (QSS)

This tutorial focuses on requirements traceability, the ability to describe and follow information about the life of a requirement. The focus will be on traceability in a systems engineering setting. The tutorial will provide a detailed look at requirements traceability and practical techniques for supporting it.

Half-Day Tutorial T3B
Advanced Object-Oriented Requirements Specification
Roel Wieringa (Free University, Amsterdam)

This tutorial presents the latest developments in object-oriented requirements methods and compares them to recent developments in structured analysis. Four methods are covered: Unified Modeling Language of Rumbaugh, Booch and Jacobson; Fusion (1996) extended with Use cases; OOA (Shlaer-Mellor); and Yourdon Systems Method (1993). The potential for combining different methods is discussed.

About the Keynote Talks

What's the Use of Requirements Engineering?
Anthony Hall (Praxis, Inc.)

Many approaches to requirements engineering exist but they often conflict. Conflicts can best be resolved by asking: "What is the use of doing that?". How addressing this question helps in choosing requirements methods and in dealing with difficulties that arise in applying the methods is discussed. Dr. Hall, a principal consultant with the software engineering company Praxis, pioneered the use of formal specification in industrial projects and led the design of the CDIS air traffic information system, one of the largest industrial applications of formal methods. He has worked on requirements for many systems and guided the development of major systems from requirements.

Requirements Models in Context
Colin Potts (Georgia Institute of Technology)

Traditional requirements engineering stresses generalization and abstraction. But, by abstracting away from the context, the designer may model only those things that are easy to model and ignore the subtleties, special cases, and concrete features of the context. In contrast, approaches that stress context at the expense of abstraction may lead to floundering or to short-term customer satisfaction at the expense of long-term system fragility. Needed is a synthesis of the two approaches. Professor Potts, a member of Georgia Tech's Software Research Center and its Graphics, Visualization and Usability Center, has held positions in both industrial R&D and software development.

Calculating with Requirements
John Rushby (SRI International)

Formal techniques, such as very strong type checking and completeness and consistency checking using decision procedures and model checking, reduce certain questions about requirements to automated (and therefore fast, cheap, and repeatable) calculations. Examples from space shuttle and other applications illustrate the techniques. Dr. Rushby, Program Director of SRI's Computer Science Laboratory, develops formal verification systems (the latest is PVS) and applies them to problems in computer security, hardware design, and safety-critical and fault-tolerant systems. PVS is currently being used in industrial projects applying formal methods to aerospace problems.

Will I Be Pretty, Will I Be Rich? Some Thoughts on Theory vs. Practice in Systems Engineering
David Harel (Weizmann Institute of Science)

The role of theoretical vs. applied research in the specification and design of reactive, highly concurrent systems is discussed. The research performed by theoreticians can be divided into three kinds of theory — theory for the sake of theory, theory of foundations and principles, and theory arising from applications. Different kinds of theory are illustrated with examples from several areas of computer science. Professor Harel is the William Sussman Professor of Mathematics at the Weizmann Institute. A cofounder and chief scientist of i-Logix, Inc., he is the inventor of the statecharts language and was part of the team that designed the Statemate system. His most recent book is "Algorithmics: The Spirit of Computing" (MacMillan 1988).

About the Symposium

RE '97, the Third IEEE International Symposium on Requirements Engineering, provides a forum for the discussion of innovative research results contributing to an engineering discipline for developing computer system requirements. RE '97 includes a strong educational program of tutorials, workshops, panels, and keynote speakers with special emphasis this year on formal methods, safety-critical systems, and industrial relevance.

About the Industrial Program

Chair: Stuart Faulk (University of Oregon)

New this year, the Industrial Program includes the tutorials, a panel on the requirements problem in industry, the Tools Exhibit, and two special sessions entitled Applications and Tools 1 and 2. The special sessions offer presentations relevant to products, problems, and results in requirements engineering in industry. Included are reports by industrial system or software developers on results and lessons learned in applying advanced requirements technology; current problem areas in elicitation, specification, or use of requirements not adequately addressed by available technology; and results and lessons learned in applying advanced requirements technology in an industrial setting. Also scheduled are short presentations introducing tools for requirements engineering. Those interested in learning more about the tools and seeing tool demonstrations may visit the Tools Exhibit.

About the Tools Exhibit

Chairs: Charles Payne (Secure Computing Corp.)
          Dwight Colby (Secure Computing Corp.)

The Tools Exhibit will run concurrently with the first two days of the Technical Program (Wednesday and Thursday). Presentations and demonstrations of state-of-the-art commercial tools along with cutting edge academic efforts are scheduled. Confirmed exhibitors include Vitech Corp. (CORE), Marconi Systems Technology, Inc. (RTM), QSS (DOORS), TD Technology (SLATE), Université Catholique de Louvain (GRAIL/KAOS), and Naval Research Lab (SCR Toolset).

About the Doctoral Consortium

Chair: Myla Archer (Naval Research Laboratory)

The Doctoral Consortium, scheduled on Monday, January 6, will give students whose doctoral research is not yet complete an opportunity to present their work to RE colleagues. Participants are selected on the basis of submitted abstracts, and attendance is by invitation only. All Consortium participants must also be registered for the Symposium.

Doctoral candidates will present their research to their peers and a panel of experts consisting of Myla Archer, Ramesh Bharadwaj, Steve Easterbrook, Anthony Finkelstein, John Gannon, James Kirby, Julio Leite, Kevin Ryan, and David Till. Registration and continental breakfast for Doctoral Consortium participants will begin at 8:00. Presentations will begin at 8:45. Lunch will be provided. On the day after the Consortium, participants may attend the second day tutorials or visit places of interest in the Annapolis/Baltimore/Washington area.

About the Workshops

Scenario-Based RE Methods
Organized by **Alistair Sutcliffe** (City University, London)

While scenarios have become an important component of requirements engineering, little guidance exists on how scenarios may be used in validation, elicitation, etc. This workshop explores the different concepts of scenarios and whether a common view exists. Means of technology transfer and research challenges will be discussed.

Software on Demand: Issues for RE
Organized by **Stephen Fickas,** (University of Oregon)

Software on demand is software that can be delivered over the Internet on an as-needed basis. The user can download full applications or small plug-ins to complete the current task at hand. This workshop will explore topics such as how to specify the requirements of software on demand and how software on the net can be organized. A prototype software on demand system will be used as a strawman.

About the Panels

Impact of Environmental Evolution on Requirements Changes
Chair: Nazim Madhavji (McGill University)

When a system is being developed, the system's environment usually keeps evolving. This environmental evolution may adversely affect the system implementation, causing functional deficiencies, performance problems, etc. To avoid such problems, the effects of environmental changes on system requirements must be identified. This panel will discuss the impact of environmental change on requirements and how this problem can be understood and solved.

How Can Requirements Engineering Research Become Requirements Engineering Practice?
Chair:Steve Miller (Collins Commercial Avionics, Rockwell)

The path of a good idea from concept to widespread industrial use is often fraught with peril. Too often, research is based upon a simplistic understanding of industry's problems. Even given a real solution to a real problem, successful transfer of that solution into practice depends on many other factors (funding, availability of tools, etc.). This panel will explore how methods for requirements engineering for real-time and embedded systems can be moved into practice. Representatives from industry will discuss their needs and problems using existing methods, researchers will discuss current research trends, and tool vendors will address the role of tools in putting methods into practice.

About the Minitutorial

Model Checking and Requirements
Daniel Jackson (Carnegie Mellon University)

With its dramatic successes in automatically detecting design errors (mainly in hardware and protocols), model checking has recently rescued the reputation of formal methods. This tutorial describes what model checking is, what tools have been developed, and how the tools might be used to analyze requirements. It also introduces *model enumeration*, a new technique that, unlike model checking, allows structures, rather than event sequences, to be analyzed automatically.

About the Technical Papers

Ten Steps Towards Systematic Requirements Reuse
W. Lam, J. A. McDermid, and A. J. Vickers

Despite several proposals which tackle the problem of requirements reuse from different perspectives, there is little evidence in the literature that reuse can be effectively put into practice. This paper presents interesting results on this subject, generated at the Technology Centre of Rolls-Royce University for the domain of aero-engine control systems. Among other things, the paper discusses some criteria towards systematic requirements reuse and supports them with actual examples from the chosen domain. The general approach of this research is refreshingly practical and can be readily adopted for similar efforts.

Reusing Operational Requirements:
A Process-Oriented Approach
Robert Darimont and Jeanine Souquieres

The key insight offered by this paper is that it pays to keep track and record the trace of decisions that generated a particular requirements specification, because this trace can be used for documentation and also reused to generate other, similar requirements. This idea has been around as long as software reuse. The paper demonstrates convincingly that the idea can work for operational requirements and explores, among other things, new linguistic features that need to be added to specification languages, so that they can capture not just operational requirements, but also the trace whereby they were generated.

-- John Mylopoulos

Analogical Reuse of Requirements Frameworks
Philippe Massonet and Axel van Lamsweerde

Reusing similar requirements fragments is a promising approach in software engineering that allows for reducing the system development cost while increasing the quality of requirements specification. The paper presents an interesting approach to reuse, using known techniques from analogical and case-based reasoning. In particular, the authors convincingly demonstrate that a rich requirements metamodel with an expressive formal assertion language can be exploited to improve the effectiveness of analogical reuse.

Enhancing a Requirements Baseline with Scenarios
Julio Cesar Leite, Gustavo Rossi, Federico Balaguer,
Vanesa Maiorana, Gladys Kaplan, Graciela Hadad,
and Alejandro Oliveros

"You want to know how things *really* work around here? Have I got some stories for you!" The early capture of requirements often starts with a set of "salient scenarios" - the stories that tell about the environment in which a new system is to operate; stories that attempt to capture the essence of the role that the system is to play in its environment. This paper examines various aspects of scenarios including a grammar for scenarios, some useful properties of scenarios, and hypertext treatment of scenarios, and advances a simple but compelling "scenario evolution" example that demonstrates how a new system will impact "how things really work."

-- Mark Feblowitz

Producing Object-Oriented Dynamic Specifications:
An Approach Based on the Concept of 'Use Case'
Benedicte Dano, Henri Briand, and Franck Barbier

Recently, use cases or scenarios have been attracting the attention of researchers and practitioners. There are reports from practitioners that the deployment of use cases enhances the quality of object-oriented specifications, but there are a lot of misconceptions and problems in the use of such strategy. This paper describes a promising approach, that departing from a tabular representation of a use cases and using a systematic process, produces object type state transition diagrams. This process uses Petri nets as the basic representation scheme to provide more rigor to the use case descriptions. An important side effect is the possibility of using Petri net tools to detect problems in a set of use case descriptions.

-- Julio Cesar Leite

A Technique Combination Approach to Requirements Engineering
Alistair Sutcliffe

As more new techniques are developed to address specific problems in RE, it is not surprising that any single technique may not fully address the needs of a practical RE situation. The practitioner may choose to use a combination of several techniques to do the job. This paper reports on an empirical study which combines three important techniques: early prototyping, scenario-based analysis, and design rationale. The findings should be of interest to practitioners and researchers alike.

-- Eric Yu

Analysing Inconsistent Specifications
Anthony Hunter and Bashar Nuseibeh

As more and more of an enterprise's information processing becomes computerized, contemporary information systems must be built to reflect the needs of multiple users and groups with different skills, motives, values, beliefs, and world-views. Hence, RE methods and languages should be provided which capture and reason about these different world-views explicitly. The emerging area of "viewpoints" addresses exactly this problem. However, an important problem with viewpoints is the possibility of inconsistencies. The paper is important because it is part of a promising line of research which addresses inconsistent specifications. It is also general enough to be potentially useful for several future lines of viewpoints research.

-- Andreas Opdahl

Requirements for Telecommunications Services:
An Attack on Complexity
Pamela Zave and Michael Jackson

A major impediment to good RE practice is the sheer complexity of the system behaviors that need to be specified. Are there techniques that could be adopted to minimize and manage this complexity? This paper answers the question affirmatively and presents several techniques that have proven useful in formally specifying behaviors in the telecommunications domain. This is an important paper not only for the complexity management techniques that it presents, but also for the questions that it asks.

-- John Mylopoulos

Systematic Trade-off Analysis for Conflicting Imprecise Requirements
John Yen and W. Amos Tiao

This work falls in an area I like - the study of requirements as the dirty little things they are. In particular, non-toy projects turn up requirements that share few of the virtues we have established: consistency, completeness, non-ambiguity. This paper overturns one of our cherished virtues: requirements are precise. Of course, they often are anything but. Nowhere is this brought out more clearly than with conflicting requirements. In real projects, the fun begins when conflicts are detected. It is then that the precision and value of the conflicting requirements is argued over heatedly by the respective camps of the project stakeholders. However, without a reasoning model, conflict resolution can be ad hoc and prone to intuition and error. The authors are working to remedy this by combining ideas from Decision Science and Fuzzy Logic in a formal model. In the end, they convinced me that requirements preciseness is not a virtue but a vice -- precise requirements are typically a pipe dream and furthermore, they allow no room for maneuver. What we need is a representation of imprecise requirements and a model to reason about them. I like this -- turning vices into virtues is a way of life when dealing with real world requirements.

-- Stephen Fickas

Naturalistic Inquiry and Requirements Engineering: Reconciling Their Theoretical Foundations
Colin Potts and Wendy C. Newstetter

Much of RE research views the area as an enterprise for developing better processes, techniques, tools and notations. Less is devoted to thinking of the kinds of domains and the kinds of realities we are supposed to "engineer" and the differences in commitments we can and should make in intervening into these domains. This paper focuses exactly on this "thinking" part and offers a well-argued and clear statement about what naturalistic inquiry is and its relation to RE. Among other things, the paper sheds light on how differences in the commitments we make in RE about the realities we are intervening into and the way in which we can know about them can make a difference in thinking of what we do or should be doing. The paper also clarifies these issues through examples and quotations from the literature. Though the paper's conclusions on the future of naturalistic inquiry in RE are not bright, the paper does shed light brightly on the dilemmas we face in RE.

-- Kalle Lyytinen

Integrated Safety Analysis of Requirements Specifications
Francesmary Modugno, Nancy Leveson, Jon D. Reese, Kurt Partridge, and Sean D. Sandys

The safety analyst has a cornucopia of different techniques available from which to choose. Guidelines as to the strengths and weaknesses of each choice are harder to come by, however. This paper reports the use of several safety techniques on the requirements of a large system. The comparative evaluation of techniques, the concrete examples of errors found, and the clearly stated conclusions will be useful to the practitioner.

-- Robyn Lutz

Formal Methods for V & V of Partial Specifications: An Experience Report
Steve Easterbrook and John Callahan

Science is there to remove myth. The bag of myths associated with the term "formal method" is so heavy that the large majority of practitioners is shying away if something close to this term comes up. This paper throws away many of these myths: Formal methods *can* be applied in a simple, yet formally correct manner, formal verification *is* beneficial, even if one never strives for completeness, "shadow" activities might provide a helpful skeleton for a project.... These are just samples of the experiences described in the paper, and there are a lot more. This work rises above parochial boundaries of software engineering. Come, listen, and benefit from the authors' rich and valuable experience.

-- Roland Mittermeir

Extended Requirements Traceability: Lessons from an Industrial Case Study
Orlena Gotel and Anthony Finkelstein

Many of us complain about the lack of good, industrial strength data to back up models and methods proposed in the RE field. The authors, indeed, have proposed yet another RE model, so we can rightfully ask them pointed questions about the new model's usefulness in a field already crowded with untested models. This paper gives a sharp reply to such questions! It backs up the model, called contribution structures, with data from a three year study of a software project undertaken by a commercial communications service provider. The heart of the paper is the recording of the *dynamic* set of personnel who were associated with the project, either as customers, end-users, developmental or managerial staff. By following the project through multiple years, with all of its personnel changes, one can see the efficacy of the authors' model in a way that would not be convincing in a small, academic exercise. Oh yes, the paper is also very well written. I applaud the authors' efforts and perseverance.

-- Stephen Fickas

On the Use of a Formal RE Language:
The Generalized Railroad Crossing Problem
Philippe Du Bois, Eric Dubois, and Jean-Marc Zeippen

Moving from an informal expression of a customer's needs to a precise representation is easier to recommend than to do. This paper gives a clear, step-by-step description of the process of requirements specification using a well-known case study and the Albert II specification language.

-- Robyn Lutz

Auditdraw: Generating Audits the FAST Way*
Neeraj K. Gupta, Lalita J. Jagadeesan,
Eleftherios E. Koutsofios, and David M. Weiss

It has often been said that there is leverage to be gained in devising software development techniques specific to coherent families of applications. This paper reports on how one family of applications was addressed using an approach that is interesting because it includes a broad range of family-specific software development artifacts, which include an application-oriented language, a tool-set, and a process for domain analysis, requirements specification, and code generation. The contribution of the paper is not in the particulars of the artifacts and process for the one reported family, but rather in the methodological insights that can be generalized to other families.

-- Sol Greenspan

*Part of the Industrial Program

The Integrated Specification and Analysis of Functional,
Temporal, and Resource Requirements
Hanene Ben-Abdallah, Insup Lee, and Young Si Kim

The requirements for an industrial process-control system often concern time and physical resources, because these are important concepts in the environment that the system will be controlling. This paper illustrates the potential benefits of special-purpose requirements languages. A language with built-in concepts of time and resources is used to specify conveniently both the requirements for and the design of a process-control system. The design is then proved to satisfy the requirements.

-- Pamela Zave

Generating Provably Consistent Code
from Hierarchical State Machines
David J. Keenan and Mats P. E. Heimdahl

Requirements specification languages emphasize readability, understandability, ease of use, and analyzability. Ultimately, however, production quality code is the desired end-product. It would be great if code could be generated automatically from specifications in such languages! It would be ideal if the generation were done in a way which gave assurance to the exact correspondence between specification and code!! This paper shows promising results in exactly this direction.

-- Martin Feather

Towards Modelling and Reasoning Support
for Early-Phase Requirements Engineering
Eric S. K. Yu

"Early-phase" requirements analysis doesn't refer to the writing of the first words on the blank first page of a system specification, nor does it focus on the initial gathering of descriptions, system functionality, or behavior. Instead, the early phase explores the organizational environment in which the software system will operate, focusing on the actors in that environment and the meaningful dependencies that these actors share. These dependencies form the primary motivations for the functionality that will eventually be selected for the system, and also help to establish some of the important nonfunctional characteristics of the system. By examining the needs, goals, beliefs, and commitments of the various actors in the system's environment, the motivations for system functionality and behavior can be better understood; that understanding should lead to a system that will fit well in its organizational environment and that will evolve effectively as the environment changes. This paper summarizes the i* (pronounced "eye star") framework, and introduces a new example that demonstrates how i* supports early-phase requirements gathering and analysis; it concludes by exploring some of the representation and reasoning support necessary to enable the capture and analysis of early phase requirements information.

-- Mark Feblowitz

A Decision Making Methodology in Support
of the Business Rules Lifecycle
Daniela Rosca, Sol Greenspan,
Mark Feblowitz, and Chris Wild

The correct alignment of an operational system to the enterprise is an important consideration for managing change. This paper advocates an approach to RE centered on the explicit representation of business rules and introduces a methodology for the acquisition, deployment and evolution of such rules. Business rules, in the context of this paper, are considered as the link between the enterprise objectives and the way these objectives are realized in operational systems. The methodology presented makes use of a metamodel that integrates three views: enterprise modeling, rationale modeling and business rules modeling.

-- Periklis Loucopoulos

A Logical Framework for Modeling and Reasoning about the
Evolution of Requirements
Didar Zowghi and Ray Offen

This paper proposes a promising formal framework for modeling and reasoning about the evolution of requirements. The framework is based on default reasoning techniques developed in AI. Apart from presenting and discussing the framework, the paper describes a supporting tool and suggests how it can be used to manage changing requirements.

-- Eric Dubois

RE '97 AT A GLANCE

Time	Monday, January 6	Tuesday, January 7	Wednesday, January 8	Thursday, January 9	Friday, January 10
8:00 / 9:00	*Tutorial T1 Making Requirements Measurable	*Tutorial T2A SCR Approach to Requirements / *Tutorial T2B Requirements Traceability	Welcome / *Keynote 1 Anthony Hall	5 Keynote Colin Potts	9 Keynote David Harel
10:30 / 11:00			Break — 2A Papers Reuse / 2B *Papers Applications and Tools 1 / *Tools Exhibit Begins	Break — 6A Papers Foundations / 6B *Papers Applications and Tools 2 / *Tools Exhibit	Break — 10A **Papers Languages and Tools / 10B *Workshop Software on Demand
12:30 / 2:00	Lunch	Lunch	Lunch — 3A Papers Scenarios / 3B *Minitutorial Model Checking	Lunch — 7 *Keynote John Rushby	Lunch — 11A Papers Life-Cycle / 11B *Panel Industrial Priorities
3:30 / 4:00	*Tutorial T1 (continued)	*Tutorial T3A Software Requirements and Safety / *Tutorial T3B Object-Oriented Requirements Methods	Break — 4A Papers Inconsistencies / 4B *Panel Impact of Env. Chgs. / *Tools Exhibit	Break — 8A Papers Case Studies / 8B Workshop Scenario-Based RE / *Tools Exhibit Ends	
5:30 / 6:00 / 7:00 / 9:00		Welcome Reception		Banquet Governor Calvert House	

Doctoral Consortium

*Events marked by an asterisk should be of special interest to attendees from industry.
**This session includes one paper that is part of the industrial program.

Symposium Program

Tuesday, January 7

Welcome Reception -- Marriott (7:00 p.m. - 9:00 p.m.)

Wednesday, January 8

Registration and Continental Breakfast (8:00-8:45)

Plenary Session 1: Welcome and Keynote Talk (8:45-10:30)

Opening Remarks
  Connie Heitmeyer and John Mylopoulos

What's the Use of Requirements Engineering?
  Anthony Hall, Praxis

Coffee Break (10:30-11:00)

Tools Exhibit (10:30-12:30)

Session 2A: Reuse (11:00-12:30)

Ten Steps Towards Systematic Requirements Reuse
  W. Lam, J. A. McDermid, and A. J. Vickers

Reusing Operational Requirements: A Process-Oriented Approach
  Robert Darimont and Jeanine Souquieres

Analogical Reuse of Requirements Frameworks
   Philippe Massonet and Axel van Lamsweerde

Session 2B: Applications and Tools 1 (11:00-12:30)

Groupware-Assisted Requirements Assessment
  Ahti Salo

Lessons Learned from Applying the Spiral Model in the Software Requirements Analysis Phase
  Viravan Chonchanok

Report on the Industrial Workshop on Requirements for R&D in Requirements Engineering
  Philip Morris, Marcelo Masera, and Marc Wilikens

SOFL: A Formal Engineering Methodology for Industrial Applications
  Shaoling Liu

Tools Presentations: *SLATE* (TD Technology), *DOORS* (QSS), *SCR Toolset* (NRL)

Lunch (12:30-2:00)

Session 3A: Scenarios and Use Cases (2:00-3:30)

Enhancing a Requirements Baseline with Scenarios
  Julio Cesar Leite, Gustavo Rossi, Federico Balaguer, Vanesa Maiorana, Gladys Kaplan, Graciela Hadad, and Alejandro Oliveros

Producing Object-Oriented Dynamic Specifications: An Approach Based on the Concept of 'Use Case'
  Benedicte Dano, Henri Briand, and Franck Barbier

A Technique Combination Approach to Requirements Engineering
  Alistair Sutcliffe

Session 3B: Minitutorial (2:00-3:30)

Model Checking and Requirements
 Daniel Jackson (Carnegie Mellon University)

Tools Exhibit (2:00-5:30)

Coffee Break (3:30-4:00)

Session 4A: Inconsistencies and Exceptions (4:00-5:00)

Analysing Inconsistent Specifications
 Anthony Hunter and Bashar Nuseibeh

Systematic Trade-off Analysis for Conflicting Imprecise Requirements
 John Yen and W. Amos Tiao

Session 4B: Panel (4:00-5:30)

The Impact of Environment Evolution on Requirements Changes
 Panel Chair -- Nazim Madhavji (McGill University)
 Panelists -- Ted Thompson (LTS Aviation), Bill Agresti (MitreTek),
 Periklis Loucopoulos (UMIST), Karel Vredenbur (IBM)

Thursday, January 9

Registration and Continental Breakfast (8:00-9:00)

Plenary Session 5: Keynote Talk (9:00-10:30)

Requirements Models in Context
 Colin Potts (Georgia Institute of Technology)

Coffee Break (10:30-11:00)

Tools Exhibit (10:30-12:30)

Session 6A: Foundations (11:00-12:30)

Requirements for Telecommunications Services: An Attack on Complexity
 Pamela Zave and Michael Jackson

Naturalistic Inquiry and Requirements Engineering: Reconciling Their Theoretical Foundations
 Colin Potts and Wendy C. Newstetter

On the Use of a Formal RE Language: The Generalized Railroad Crossing Problem
 Philippe Du Bois, Eric Dubois, and Jean-Marc Zeippen

Session 6B: Applications and Tools 2 (11:00-12:30)

GRAIL/KAOS: an Environment for Goal-driven Requirements Analysis, Integration and Layout
 R. Darimont, E. Delor, P. Massonet, and A. van Lamsweerde

Requirements Metrics - Value Added
 T. Hammer, L. Rosenberg, L. Huffman, and L. Hyatt

Eliciting Requirements: Beyond the Blank Sheet of Paper
 Haim Kilov and Ian Simmonds

Tools Presentations: *GRAIL/KAOS* (Université Catholique de Louvain), *CORE* (Vitech Corp.), *RTM* (Marconi Systems Tech.)

Lunch (12:30-2:00)

Plenary Session 7: Keynote Talk (2:00-3:30)

Calculating with Requirements
 John Rushby (SRI, International)

Coffee Break (3:30-4:00)

Tools Exhibit (3:30-5:30)
 (This is the final session of the Tools Exhibit)

Session 8A: Case Studies (4:00-5:30)

Integrated Safety Analysis of Requirements Specifications
 Francesmary Modugno, Nancy Leveson, Jon D. Reese, Kurt Partridge, and Sean D. Sandys

Formal Methods for V & V of Partial Specifications: An Experience Report
 Steve Easterbrook and John Callahan

Extended Requirements Traceability: Lessons from an Industrial Case Study
 Orlena Gotel and Anthony Finkelstein

Session 8B: Workshop (4:00-5:30)

Scenario-Based RE Methods
 Organizer: Alistair Sutcliffe (City University, London)

Cocktails -- Governor Calvert House (6:00-7:00)

Banquet -- Governor Calvert House (7:00-9:00)

Friday, January 10

Registration and Continental Breakfast (8:00-9:00)

Plenary Session 9: Keynote Talk (9:00-10:30)

Will I Be Pretty, Will I Be Rich? Thoughts on Theory vs. Practice in Software Engineering
 David Harel (Weizmann Institute)

Coffee Break (10:30-11:00)

Session 10A: Languages and Tools (11:00-12:30)

Auditdraw: Generating Audits the FAST Way (Industrial Paper)
 Neeraj K. Gupta, Lalita J. Jagadeesan, Eleftherios E. Koutsofios, and David M. Weiss

The Integrated Specification and Analysis of Functional, Temporal, and Resource Requirements
 Hanene Ben-Abdallah, Insup Lee and Young Si Kim

Generating Provably Consistent Code from Hierarchical State Machines
 David J. Keenan and Mats P. E. Heimdahl

Session 10B: Workshop (11:00-12:30)

Software on Demand: Issues for Requirements Engineering
   Organizer: Stephen Fickas (University of Oregon)

Lunch (12:30-2:00)

Session 11A: Life-Cycle (2:00-3:30)

Towards Modelling and Reasoning Support for Early-Phase Requirements Engineering
   Eric S. K. Yu

A Decision Making Methodology in Support of the Business Rules Lifecycle
   Daniela Rosca, Sol Greenspan, Mark Feblowitz, and Chris Wild

A Logical Framework for Modeling and Reasoning about the Evolution of Requirements
   Didar Zowghi and Ray Offen

Session 11B: Panel (2:00-3:30)

How Can Requirements Engineering Research Become Requirements Engineering Practice?
   Chair: Steve Miller (Collins Commercial Avionics, Rockwell)

Closing Remarks (3:30-3:40)

Items on the symposium program marked in BLUE should be of special interest to attendees from industry.

Annapolis

Annapolis, the site of RE '97, is a historic seaport on the scenic shores of the Chesapeake Bay. Annapolis is the seat of state and county government as well as home to the U. S. Naval Academy. It is a city with a rich and colorful heritage leading back to Colonial times. For general information about Annapolis and the U. S. Naval Academy, please browse the appropriate links at our web site. Those links give information about local events, shopping, historic sites, restaurants, and more. The web site is

http://www.itd.nrl.navy.mil/conf/ISRE97

Weather in the Annapolis area is relatively mild in winter. Expect highs in the mid 40's (5 to 10 degrees C.), lows in the upper 20's (-5 to 0 degrees C.). The first two weeks in January are often stormy, so there is a good chance of rain or snow during this period. Definitely pack a warm coat and an umbrella.

Welcome Reception

From 7:00 to 9:00 p.m. on Tuesday, January 7, a welcome reception for all attendees and guests will be held at the Marriott Hotel. Meet the members of the organizing committee and symposium presenters while renewing old acquaintances and making new ones.

Symposium Banquet

The symposium banquet is scheduled from 7:00 to 9:00 p.m. on Thursday, January 9. The banquet will be held at the Governor Calvert House, one of the finest banquet facilities in the area. The banquet will be preceded by a cocktail hour beginning at 6:00 p.m. The Governor Calvert House (not to be confused with the Calvert House Restaurant on Solomon's Island Rd.) is one of the Four Historic Inns, comprised of guest rooms in restored Colonial and Victorian residences surrounding two traffic circles in the center of old Annapolis.

Annapolis Marriott Waterfront Hotel

The RE'97 hotel is located on the banks of the Chesapeake Bay overlooking Annapolis Harbor. It is five minutes walking distance to the old historic part of town (where the Governor Calvert House will host our symposium banquet) and a three minute walk to the U. S. Naval Academy. Parties wishing to leave messages for symposium attendees should phone +1-410-268-7555 and ask for the registration desk for RE'97.

Hotel Directions Within Annapolis

To reach the hotel, take exit 24 from U. S. Highway 50 onto Rt. 70 (Rowe Blvd.) and continue to its end. Turn right on College Avenue, merge onto Church Circle, then turn right on Duke of Gloucester (Maryland Inn will be on the left). Continue down Duke of Gloucester, staying in the left lane. Turn left onto St. Mary's Street. The Marriott is at the end of St. Mary's Street on Compromise Street.

Directions to Annapolis from BWI Airport

From the airport, take Elm Rd. north turning right onto Aviation Blvd. Then, turn left onto Dorsey Rd. (Highway 176 east) to I-97. Take I-97 south, then U. S. 50 east to Annapolis.

Limousine/Shuttle Service

Shuttle buses and limousines operate regularly from BWI airport to the Annapolis hotels. Please make reservation at least 4 hours (preferably 24 hours) before departure:

        Private Car (limousines) +1-410-519-0000
                ($43 one way—up to 4)
        Absolute Limousine: +1-800-204-2580
                ($40 one way—up to 4, $10 each additional)
        Maryland Limousine: +1-410-859-8168
                ($35 one way—no charge each additional)
        Airport Vans +1-800-474-9988
                ($26 one way—$5 each additional)
        BWI Super Shuttle +1-800-809-7080
                ($17 one way/$26 round trip per person)

Most of these also service the Amtrak train station near BWI Airport. Airport shuttles are also available for National and Dulles International Airports +1-800-776-0323.

Tour of the U. S. Naval Academy

A special group tour of the U. S. Naval Academy for RE'97 attendees and their guests is planned. The Academy is the undergraduate college for the U. S. Navy, preparing young men and women to become professional officers in both the U. S. Navy and the U. S. Marine Corps. If interested, please check the appropriate boxes on the registration form.

Cross-Country Ski Trip

The cross-country ski trip on Friday and Saturday, January 10-11, is your chance to get out into the countryside, get some exercise, taste some local cuisine and mingle with the local folks! Western Maryland offers spectacular scenery, including the state's highest point, tallest waterfall, biggest freshwater lake, picturesque parks, and points of historic interest. We will drive to western Maryland on Friday, the evening of January 10. On Saturday we will cross-country ski in the New Germany State Park, and time permitting, do some driving as well. Should there be no snow on the ground, we will do some hiking instead. We will return to Annapolis late Saturday night.

The charge for the outing is $60, which includes transportation and ski rentals. You will need to make your own arrangements to stay Friday night at the Grantsville Holiday Inn. You will also need to buy your own meals. The total cost per individual will be about $200. The trip is being organized with the help of a local outdoors organization, the Northern Virginia Hiking Club. Check out their home page at http://members.aol.com/nvhc.

To register, please fill out the appropriate part of the registration form. Include a check for U. S. $60 payable to the "Northern Virginia Hiking Club." After you register, you will receive an information packet with details about the trip, including specifics on lodging and steps you will need to take. We recommend appropriate rain gear and cold weather clothing, which includes long polyester underwear, wool or fleece sweater or jacket, two pairs of socks (synthetic inner layer and woolen outer layer), waterproof gloves or mittens, wool or fleece hat (preferably with flaps to cover your ears), and a wind shell.

Should you have any questions, please call Ramesh Bharadwaj at +1-202-767-3107 or send e-mail to ramesh@itd.nrl.navy.mil.

Hotel Registration Form for RE'97

Rooms are being held especially for you and the others attending RE'97. All reservations requests must be accompanied by a one night room deposit with check or credit card guarantee. Requests received without a one night deposit or guarantee will be returned. Once this block is filled, your reservation request will be considered at regular rates based upon availability. Reservations must be received by **5:00 p.m. Friday, December 13, 1996**, by the Annapolis Marriott Waterfront Hotel.

Please Print:

Name:_____

Affiliation:_____

Address:_____

_____

Arrival:_____ Departure:_____

Type of Accommodations:

❏ Single $76.00 inclusive   ❏ Double $76.00 inclusive

❏ Smoking ❏ Nonsmoking ❏ King Bed ❏ 2 Double beds

Name(s) of person(s) sharing room:_____

Payment Information:

❏ Check or money order enclosed ❏ Visa ❏ Master Card

❏ Carte Blanche ❏ Diners Club ❏ AMEX ❏ Discover

Credit Card #:_____ Exp. Date:_____

I understand that I am liable for one night's room tariff and tax which will be covered by my deposit or billed through my credit card in the event that I do not arrive or cancel (by 4:00 p.m.) on the arrival date indicated:

Name (exactly as on credit card):_____

Signature:_____

Please return form to:

        Annapolis Marriott Waterfront Hotel
        Attn: Reservations
        80 Compromise Street
        Annapolis MD 21401 USA
        Phone: +1-800-336-0072
                +1-410-268-7555 (outside U.S.A.)
        Fax: +1-410-269-5864

It is important to us that you enjoy RE'97. If you have any special needs or requirements, please let us know in the space provided below and we will do our best to accommodate you:

_____

_____

RE '97 Registration Form

To register, return this form with payment to:

Naval Research Laboratory
Attn: Code 5546 (RE '97)
4555 Overlook Avenue, S.W.
Washington, DC 20375-5337
or Fax to +1-202-404-7942

For more information, call
+1-202-404-8888
or e-mail stone@itd.nrl.navy.mil
(Sorry - no phone or e-mail
registrations)

Name:_____

Affiliation:_____

Address:_____

_____

Phone:_____Fax:_____

E-mail Address:_____

Personal/Organization Web Page:_____

Method of payment? ❏ Check or money order (U. S. bank only)

payable to **IEEE Computer Society**

❏ Visa   ❏ MasterCard   ❏ Diners   ❏ AMEX

Credit Card #:_____Exp. Date:_____

Name (exactly as on credit card):_____

Signature: _____

IEEE CS or ACM Membership No:_____

Special dietary requirements?_____

❏ Do not include my e-mail/web information on distributed materials

Tutorials

❏ T1 -- Monday: Making Requirements Measurable

❏ T2A -- Tuesday morning: SCR Approach

❏ T3A -- Tuesday afternoon: Requirements and Safety

❏ T2B -- Tuesday morning: Traceability

❏ T3B -- Tuesday afternoon: Object-Oriented Methods

NOTE: Select no more than one morning and one afternoon tutorial.

Fee Computation

Symposium fee $_____

Tutorial fee $_____

Discount for tutorial   ($_____)

Additional Guest Banquet Tickets:

_____ x $50.00 $_____

Total Due $_____

Registration Information and Fees

• To qualify for reduced rates, registration must be faxed or postmarked by **December 1, 1996.**

• Advance registrations will be confirmed by phone/fax or e-mail when processed.

• Registrations postmarked after December 1, 1996, will be returned and accepted on-site only. Cancellations are subject to a $50 administration fee. Written cancellations must be received no later than **December 18, 1996**. All no-show registrations will be billed in full.

• Students are required to show current proof of full-time student status at the time of registration.

• On-site registration will be available throughout the symposium.

What Your Registration Includes

Symposium registration includes admission to the technical sessions, three continental breakfasts, coffee breaks, reception, banquet dinner, and proceedings.

Tutorial registration includes admission to the selected tutorial(s), one copy of tutorial notes, a continental breakfast, and coffee breaks.

Fee Table

	Advance	Late
Symposium		
IEEE CS/ACM/SIGSOFT Member	$395	$495
Nonmember	$495	$595
Full-Time Student	$135	$175
Full-Day Tutorial		
IEEE CS/ACM/SIGSOFT Member	$250	$335
Nonmember	$335	$420
Half-Day Tutorial*		
IEEE CS/ACM/SIGSOFT Member	$150	$195
Nonmember	$195	$245

*$50 discount for anyone who registers for two half-day tutorials.

Social Events

Ski Trip

I am signing up _____ participants for the ski trip.

Enclosed is a separate check for _____ x $60 = $_____
payable to **Northern Virginia Hiking Club, Inc.** My phone number is included on my check.

Tour of U. S. Naval Academy

I am interested in taking a tour of the Naval Academy:

❏ Yes   ❏ No

How many nonparticipating guests would be interested in taking a tour of the Academy? _____